

not of a thoroughly convincing nature, all the more so, seeing that the work is primarily intended for the layman, who has not the means of sifting out such matter and putting the correct interpretation upon it. Thus in dealing with Malta fever, in a few short sentences he would lead the reader to infer that mosquitoes often serve as the "inoculating" agents, and unfortunately leaves one entirely in the dark as to the true cause of the spread of this disease.

Many of the photographic illustrations which accompany this work are very good; indeed, more especially so are those representative of the various developmental stages of the mosquitoes; we do not agree with the author's statement, however, that all his pictures show "the insects, not as we think they should be, but as they actually are," because both colour values and general morphological characters are in many instances entirely wanting, and the resulting print is nothing more than a silhouette. Moreover, the photographs of both museum and microscopical preparations show a marked absence of care and neatness in the display of the various organs, and such figures as these stand out in marked contrast to those of Manson, Kellog, Nuttall, and others. We would point out also that Figs. 76 and 77 represent a female and male mosquito respectively, and not the reverse order, as stated by the author. *Ochromyia anthropophaga* (p. 49) should read *Auchmeromyia luteola*. The latter, not the former, is the parent of the congo-floor maggot.

This work is furnished with an extensive and useful bibliography occupying forty-seven pages, to which annotations are appended.

SYSTEMATICS.

Die taxonomischen Grenzen der Art und ihrer Unterabteilungen. Versuche einer genauen Definition der untersten systematischen Kategorien. By Andreas Semenov-Tian-Shansky. Pp. 24. (Berlin: R. Friedlaender and Son, 1910.) Price 2s.

THIS is the German translation of a pamphlet which appeared first in Russian. It deals on a wide basis with the definition of the term species and the lower categories in classification. The author—whose title, "Tian-Shansky," reminds us of his exploration of the Tian-shan or Celestial Mountains in Central Asia—pleads for uniformity of terminology in the various branches of botany and zoology, and then proceeds to examine critically the opinions of various botanists and zoologists on the criteria of species and its several component varieties. The large experience gained by Semenov from his many years' study of insects, especially Coleoptera, and his acquaintance with at least an essential portion of the literature bearing on the subject, enable him to substantiate his criticisms by illustrations drawn from his own knowledge and to adduce corroborative evidence from the writings of other authors. The co-existent species are defined by the author as units which are morphologically and psycho-physiologically separated from each other. The units thus isolated do not fuse, although very occasional intercrossing

may occur. The individuals belonging to a species may all be practically alike, or they may form various kinds of varieties. Semenov defines four principal categories of modifications within a species:—

1. Subspecies or geographical race (*subspecies*) is the most important subdivision of a species, inasmuch as it represents a phylogenetic stage one degree below the complete separation from the parent stock.
2. Nation (*natio*) is a term proposed by Semenov for local varieties which are subdivisions of a subspecies, each *natio* occupying only a comparatively small definite portion of the whole area of the subspecies.
3. Morph (*morpha*) is adopted for the non-geographical varieties which are produced by the action of the seasons, the soil or the food.
4. Aberration (*aberratio*) is employed for purely individual deviations from the normal type.

It appears to us so very difficult and often impossible to draw in nature a distinction between subspecies and nation (=sub-subspecies) that in many cases the employment of one or the other term will entirely depend on the personal opinion of an author. The Greek term *morpha* does not appeal to us as a happy choice, and will hardly recommend itself to systematists generally, who are used to the Latin term *forma*, often employed with a convenient qualifying addition, such as *f. temp.*, for the seasonal form.

The pamphlet is a lucid interpretation of the distinguished author's view, and will be read with great profit by all who are interested in the philosophical aspect of systematics.

K. J.

COORDINATE GEOMETRY.

An Elementary Treatise on Coordinate Geometry of Three Dimensions. By R. J. T. Bell. Pp. xvi+355. (London: Macmillan and Co., Ltd., 1910.) Price 10s. net.

THE substance of this volume has formed the material of a course of lectures delivered for some years past to undergraduates in Glasgow. Its object is to provide the student, whose bent is towards applied mathematics, with as complete an exposition of the subject as he will require, and at the same time to act as an introduction to those who intend to proceed to a more exhaustive study of differential geometry and the theory of surfaces. Its scope is best indicated by a brief enumeration of the headings of the chapters:—coordinates, direction ratios, the plane and straight line, change of axes, the sphere, the cone, the conicoids, axes of sections, generating lines, confocals, the general equation of the second degree, systems of conicoids, conoids and general surfaces, curves in space, ruled surfaces, curvature, geodesics. It will be noted that there is no mention of homogeneous and tangential coordinates. The author has excluded these on the ground that the student has already acquired a knowledge of the general principles involved from his work in plane geometry. The same consideration has led him to exclude any section on duality or reciprocation. Some teachers will regret this omission, as the student is

always interested in the extension of general processes from two to three dimensions.

For those who are studying the subject with little or no external assistance, this is certainly an admirable text-book. The writer is evidently fully conscious of the kinds of difficulties that beset the inexperienced student. The expository work is excellent throughout, but in particular we may direct attention to the section on the discriminating cubic, the chapter on the intersection of conicoids, and the treatment of tortuous curves, which is always a serious stumbling-block at a first reading. Easy numerical examples are freely provided throughout the text to illustrate the working of each new idea. We are particularly glad to see that a fairly complete set of answers has also been supplied. At the end of each chapter there are sets of harder examples, which include some of considerable difficulty, and the book closes with a useful index.

Within the limits which the author has chosen the volume will be found comprehensive, thoroughly trustworthy, and eminently lucid. Those who have had much to do with higher school work or the junior students at the universities have felt for some time the need of a new text-book on solid geometry. We have no doubt that lecturers and tutors will find this volume most useful for their pupils, and we shall not be surprised if a welcome is extended to it from abroad.

PHYSICAL CHEMISTRY.

Traité de Chimie générale. By Prof. W. Nernst. Ouvrage traduit sur la 6^e édition allemande. By Prof. A. Corvisy. Première Partie. Propriétés générales des Corps. Atome et Molécule. Pp. iv+510. (Paris: A. Hermann et Fils, 1911.) Price 12 francs.

IN the movement associated with the rapid development of general chemistry during the last twenty-five years, the apathy displayed by a considerable section of French chemists affords a striking contrast to the activity and enthusiasm which has marked the progress of physical chemistry in other countries. For this state of affairs there can be little doubt that the chief factor responsible is to be found in the influence of the older generation of chemists, whose attitude towards the problem involved in the operation of chemical forces has been determined largely by a patriotic adherence to the doctrines of Berthelot. Signs are not wanting, however, that the resistance, which has been offered to the spread of more rational and modern views, is rapidly decreasing.

The translation of the sixth edition of Nernst's well-known work cannot fail to accelerate the acceptance of these views, and the service rendered by the translator in bringing this classical treatise within reach of the average French student of chemistry is no mean one. Since the appearance of the first edition of the work, published in 1893, the book has undergone many alterations, and by appropriate additions

the author has contrived to maintain its character as a thoroughly modern treatise of general chemistry.

Amongst such changes may be noted a more detailed treatment of the molecular theory in its application to the liquid and gaseous states of aggregation on the basis of the van der Waals's and the reduced equations of condition. Considerable modifications have also been made in dealing with the subject of electric conduction, and more particularly with the phenomenon of conduction in gases. The recent rapid progress of knowledge in the domain of colloidal chemistry has also necessitated an extension of the chapter dealing with the colloidal state, and a short section is devoted to the consideration of radio-activity. In this, the author's aim is not so much that of recording the epoch-making discoveries which have been made in recent years, as to show the general bearing of the ideas, which have resulted from these investigations, on the atomic and molecular theories.

As an exposition of the general properties of matter the book occupies a unique position, and the rapid sequence of new editions in the original language is a fitting testimony to the widespread recognition of its intrinsic merits in the country of its origin.

As in the case of many other German publications, exception must be taken, however, to the comparative neglect of the work of physical chemists in other countries. This is doubtless more or less accidental, but it is a matter to which attention might be given by the author in the event of the issue of further editions or translations. The present translation claims to be a faithful reproduction of the German, and, as such, the translator's task appears to have been carried out in a highly commendable manner.

OUR BOOK SHELF.

Elements of Analytical Geometry. By Prof. G. A. Gibson and Dr. P. Pinkerton. Pp. xxi+475. (London: Macmillan and Co., Ltd., 1911.) Price 7s. 6d.

It is too often the custom to regard analytical geometry and analytical conics as synonymous terms. Most introductory treatises on Cartesian methods limit their scope to the investigation of properties of curves of the second degree, and it is left to writers on the calculus to supplement this course with a brief mention of the nature and functions of a few higher plane curves. A preliminary course in the use of fundamental formulæ is clearly essential, but so soon as facility in expression and interpretation has been acquired, it is both instructive and interesting for the student to realise their application, not merely to the conic, but to curves of a more general character. We therefore welcome the insertion of a chapter, following immediately after a thorough treatment of the straight line and circle, which introduces the student to the conchoid and cissoïd simultaneously with the conic. The next sixty pages are devoted to the investigation of the shapes of curves which have simple algebraic equations of the type $y=f(x)$, with special reference to turning values and asymptotic forms. In some respects, simplicity would be secured by a more direct appeal to the methods of the calculus than the authors care to adopt. Such a treatment as is indicated in Mr. Mercer's recent text-book, entitled